

Glenfield Pumping Rams

for
Rural Water
Supplies



Hydrautomat
(1931) LTD. VICTORIA STATION HOUSE. LONDON

ASSOCIATED WITH GLENFIELD & KENNEDY LTD., KILMARNOCK

Glenfield Pumping Rams

for Rural Water Supplies

Applications:-

It is generally recognised that the Hydraulic Ram is, if not the most efficient, at least a simple and most economical water motor.

For many installations it is ideal, and if a plentiful supply of running water is available it can be readily installed for raising water to storage at such a height as will ensure a continuous service for :—

- (1) Small villages or groups of houses too isolated to be served by regular gravitation supply.
- (2) Farms and Agricultural Tracts.
- (3) Country Houses, Stables and Gardens.
- (4) Rural Institutions, such as Sanitoriums, Asylums and the like.
- (5) Small Irrigation supplies.
- (6) Isolated Locomotive Water Towers.

The Simple Hydraulic Ram

The Simple Hydraulic Ram utilises the pressure rise resulting from the instantaneous stoppage of motion of a column of water flowing in the drive pipe to force a smaller quantity of the same water to a higher level.

The simple ram consists of a body A, dash valve B, which is normally kept in the fully open position by virtue of its weight; an air vessel C, in the lower part of which is situated a delivery valve D.V., and above that, in the wall of the air vessel, a connection for the delivery pipe H.

The supply water gravitates down the drive pipe and flows through the open dash valve until sufficient velocity is acquired to close this valve suddenly. This action causes a sudden pressure rise in the ram, which opens the delivery valve and forces a quantity of water up the delivery pipe. When this sudden pressure subsides, the water again flows through the dash valve which has now fallen open by its own weight, and the cycle of operations is repeated.

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Glenfield Pumping Rams

Simple and Compound Types

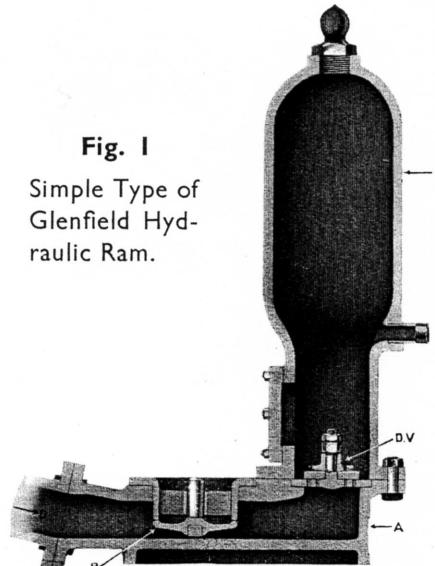


Fig. 1

Simple Type of
Glenfield Hy-
draulic Ram.

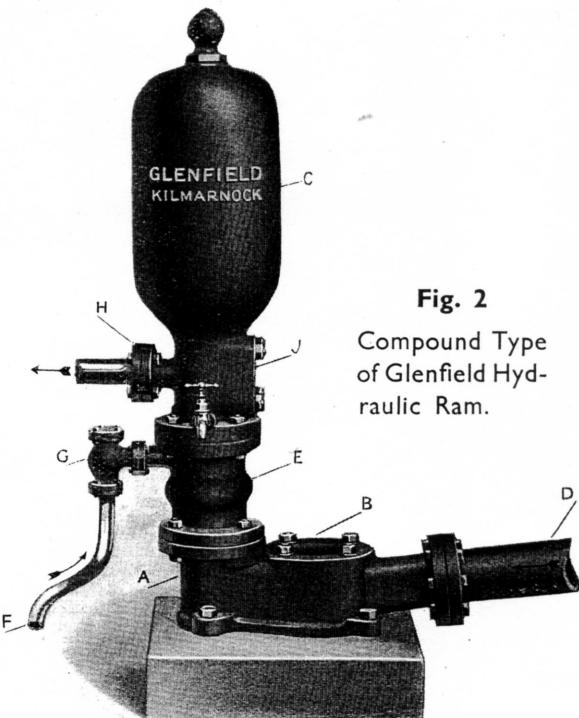
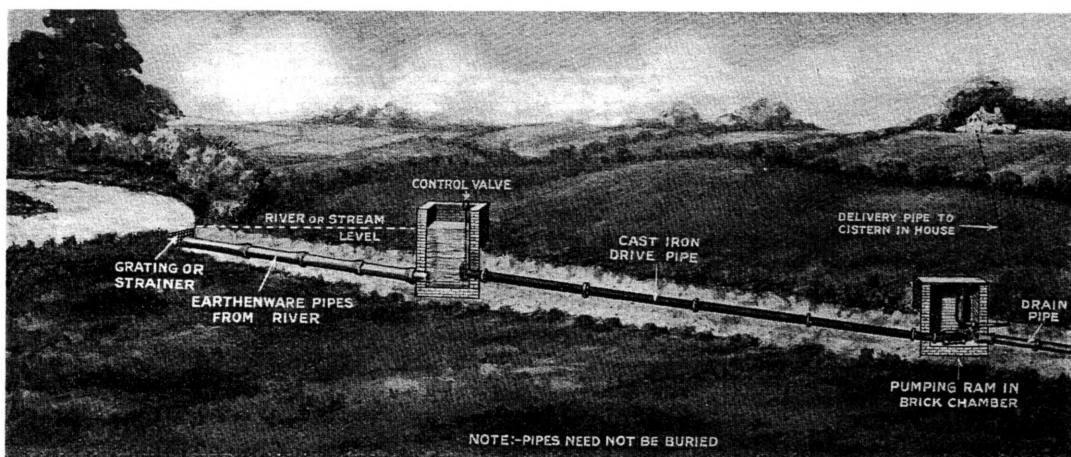


Fig. 2

Compound Type
of Glenfield Hy-
draulic Ram.

Typical Operating arrangement for Hydraulic Ram



A large air vessel fitted to each ram ensures steady delivery. The whole construction of the ram is simple and robust and there are no complicated parts to interfere with its methodical rhythm which continues indefinitely once the supply has been turned on.

The Compound Hydraulic Ram

In the case of the simple ram, the power water supply and the water delivered are both derived from the same source, *i.e.* a proportion of the power water passing along the drive pipe is delivered at each beat of the ram to the storage tank.

Circumstances may require that power water, which is unsuitable for domestic purposes, should be utilised to raise potable water from a different source. In such cases a Compound Ram must be installed. A machine of this type is shown in Fig. 2.

In outward appearance the compound ram differs only slightly from the simple type. Between the ram body A and the delivery valve is interposed a cylindrical casting E provided with a suction pipe F and check valve G. A piston working in this cylinder is so arranged that the potable water which comes in contact with its upper surface, can never be contaminated by the power water, which is confined to the lower side of the piston.

The sequence of operations is identical with that of the simple ram except that, instead of the power water being forced up the delivery pipe, the sudden pressure rise drives the piston upwards which forces a quantity of pure water through the delivery valve into the delivery pipe.

As the pressure rise in the ram subsides, the dash valve again opens, allowing the power water to escape and the piston moves downwards due to its weight, thus drawing in a further supply of potable water through valve G. When sufficient velocity has been attained, the dash valve suddenly shuts, and the sequence of operations continues uninterruptedly until the power water is shut off.

General Observations

In compound rams the suction water level should not be lower than the base of the ram. It is preferable if a "drowned" suction can be arranged, as the efficiency is thereby increased.

The rams are designed to operate with a power supply at a minimum head of 3 feet.

The quantity of water raised and the height to which it can be delivered depend entirely upon the quantity of power water available and its head above the ram inlet level.

The length of the drive pipe, *i.e.* the length of pipe that the power water traverses to the ram, should not be less than 60 feet.

In circumstances where the amount of power water available is not sufficient to supply the ram for 24 hours a day, we have on many occasions successfully installed an automatic device to stop the ram when the supply falls low, and restart it when a sufficient amount has again accumulated.

In both types of ram a hand hole with an inspection cover is provided at J, through which the delivery valve may be inspected, and every part is thus easily accessible.

Specification

The ram body, air vessel and inspection cover (also, in the case of the compound ram, the cylinder) are constructed of close grained homogeneous cast iron, accurately machined where necessary. The dash valve and seat are of specially hard gunmetal and the delivery valve is of selected india-rubber, working on a machined gunmetal seat. The compound ram has, in addition, a gunmetal suction check valve.

A brass test cock is fitted to the base of the air vessel.

Drive pipes and delivery pipes are not supplied with the rams unless specially ordered. The former should preferably be double flanged with rubber joints, and the latter may be galvanized steel tubing with flanges or screwed couplings as preferred.

Standard Sizes

The following table gives the range of standard sizes for SIMPLE rams, together with the quantities of water delivered according to supply and fall of power water available.

No.	Dia. of Drive Pipe	Dia. of Rising Pipe	Quantity raised 100 feet in 24 hours according to fall
1	1 $\frac{1}{2}$ "	$\frac{3}{4}$ "	GALLONS 200 to 1,400
2	2"	1"	350 to 3,000
3	3"	1 $\frac{1}{4}$ "	250 to 7,000
4	4"	1 $\frac{1}{2}$ "	1,500 to 13,000
5	5"	2"	2,400 to 20,000
6	6"	2 $\frac{1}{2}$ "	2,800 to 28,000

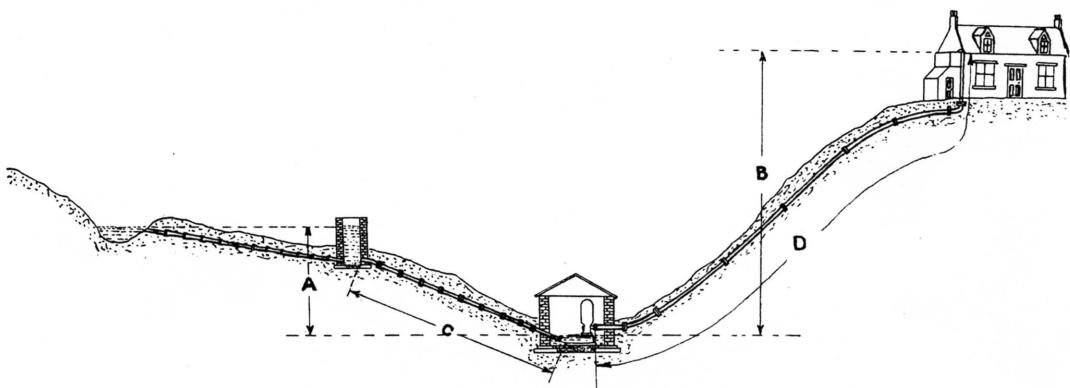
NOTE.—In all cases, enquiries for pumping rams should be accompanied by the full particulars covered by the questions printed on page 6, to enable us to determine the correct size and type of ram for the duty.

Advantages of Glenfield Pumping Rams

1. They represent the acme of simplicity, particular care having been taken to avoid complicated parts which would be liable to give trouble.
2. They require no lubrication and little or no attention, a periodical and casual inspection being all that is necessary.
3. The first cost is extremely low and there are practically no maintenance charges.
4. Parts which may require very occasional renewal are so designed that a wholly unskilled workman can do what is required.
5. They work continuously day in and day out with only one requisite—a steady flow of power water.
6. Only a small storage tank is required for delivered water. For this purpose old receptacles, such as boilers, casks, etc., can be utilised at little or no cost.

When enquiring for a Ram to suit any existing conditions, please answer the following questions as far as possible.

1. What fall is available between the stream, lake, or other source of power water and the point where you desire to instal the ram? i.e. what is the difference in level measured vertically between the two points at A. (See sketch.)
2. To what height in feet above the level of the ram do you wish to raise the water? (See B in sketch.)
3. What quantity of water is available at the source of supply? Give roughly quantity in gallons per day or hour if possible.
4. How much of this water do you wish to raise for consumption or storage in gallons per day or hour?
5. What length of drive pipe will be available? i.e. what is the distance between inlet of power water and ram? (See C in sketch.)
6. How far is the storage tank situated from the ram? (See D in sketch.)



Overall Dimensions of Glenfield Pumping Rams

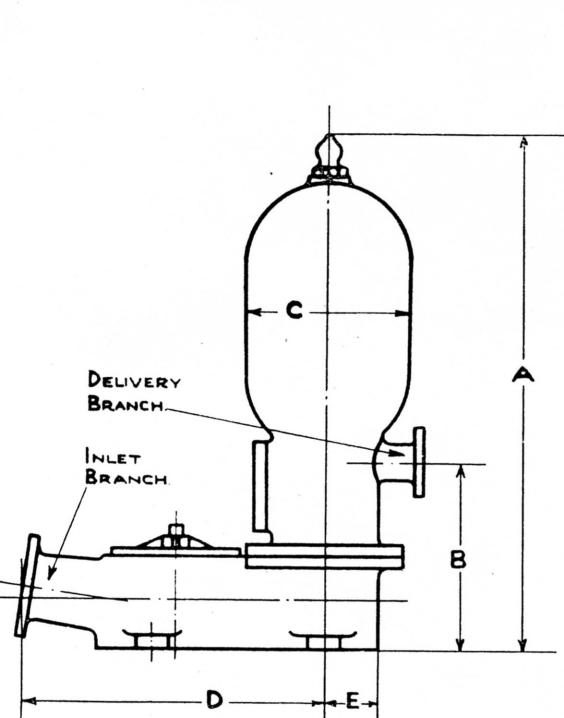


Fig. 4—Simple Ram

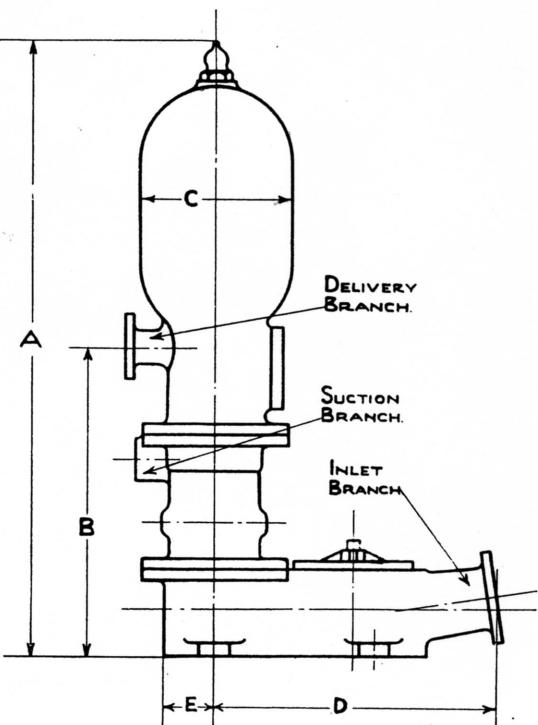


Fig. 5—Compound Ram

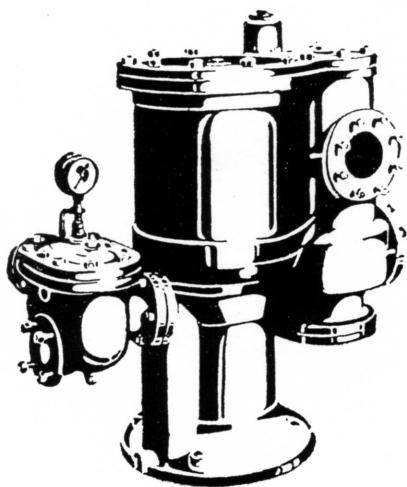
Dia. of Inlet Pipe	Dia. of Delivery Pipe	SIMPLE RAM					COMPOUND RAM				
		A	B	C	D	E	A	B	C	D	E
1 $\frac{1}{2}$ "	$\frac{3}{4}$ "	26 $\frac{3}{4}$ "	8 $\frac{1}{4}$ "	7"	14"	2 $\frac{1}{4}$ "	—	—	—	—	—
2"	1"	37"	10"	9 $\frac{1}{8}$ "	17 $\frac{3}{4}$ "	2 $\frac{1}{2}$ "	—	—	—	—	—
3"	1 $\frac{1}{4}$ "	38"	15 $\frac{3}{4}$ "	9 $\frac{1}{8}$ "	17 $\frac{3}{4}$ "	2 $\frac{3}{4}$ "	47"	24 $\frac{3}{4}$ "	9 $\frac{1}{8}$ "	17 $\frac{3}{4}$ "	2 $\frac{3}{4}$ "
4"	1 $\frac{1}{2}$ "	43 $\frac{3}{8}$ "	15 $\frac{1}{8}$ "	13 $\frac{1}{2}$ "	25"	4 $\frac{1}{2}$ "	55 $\frac{1}{2}$ "	27 $\frac{1}{4}$ "	13 $\frac{1}{2}$ "	25"	4 $\frac{1}{2}$ "
5"	2"	49"	14 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	23 $\frac{1}{4}$ "	3 $\frac{1}{2}$ "	61"	26 $\frac{1}{2}$ "	13 $\frac{1}{2}$ "	23 $\frac{1}{4}$ "	3 $\frac{1}{2}$ "
6"	2 $\frac{1}{2}$ "	45"	19"	13 $\frac{1}{2}$ "	26 $\frac{1}{4}$ "	4 $\frac{1}{4}$ "	57"	31"	13 $\frac{1}{2}$ "	26 $\frac{1}{4}$ "	4 $\frac{1}{4}$ "

NOTE.—A simple brick chamber provided with a drain pipe is all that is necessary to house the ram. This chamber is usually sunk below ground level so as to provide the maximum head for the power or driving water and to keep the suction water level (in the case of the Compound Ram) as high as possible in relation to the ram itself, an arrangement which greatly increases the efficiency of the ram.

We also manufacture

The Hydrostat

An automatic and
SILENT working
machine for boost-
ing and pumping



In some cases of automatic water pumping by means of the flow in a stream, the hydraulic pumping ram is not entirely suitable. For these conditions we have developed the Hydrostat, which is an automatic hydraulic pump of high efficiency, and with a very much greater range of capacity than the ram, which it is not intended to supersede, but its application is for those cases where the ram cannot be used.

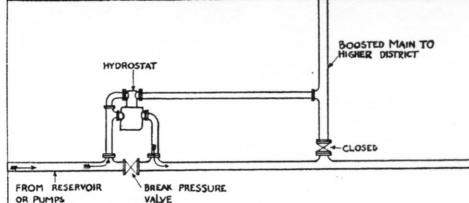
In addition to the straightforward pumping of water from a stream, and making use of the flow in the stream to develop the power necessary for pumping, the Hydrostat has a number of other applications, some of which are indicated diagrammatically in the accompanying illustrations.

Separate pamphlets are available, dealing with the numerous applications of the Hydrostat, and its method of operation. Copies of these will be sent on request.

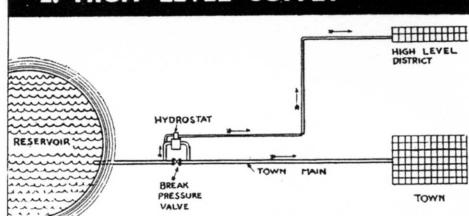
We maintain a staff of fully qualified engineers to investigate problems of water supply, and shall be glad to arrange for an examination to be made of the site, to plan the scheme and put forward proposals, on receiving a request for these services.

TYPICAL APPLICATIONS

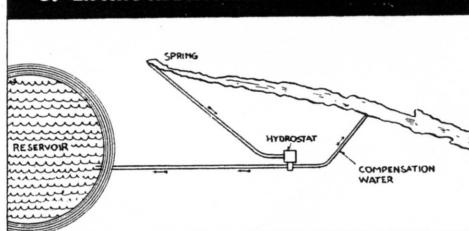
1. BOOSTING AND PUMPING



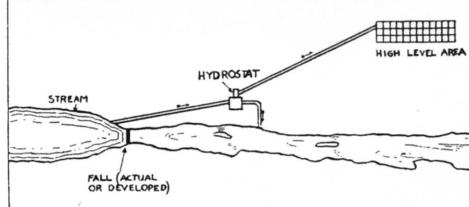
2. HIGH LEVEL SUPPLY



3. LIFTING ADDITIONAL WATER INTO RESVR.



4. WORKING FROM STREAM



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